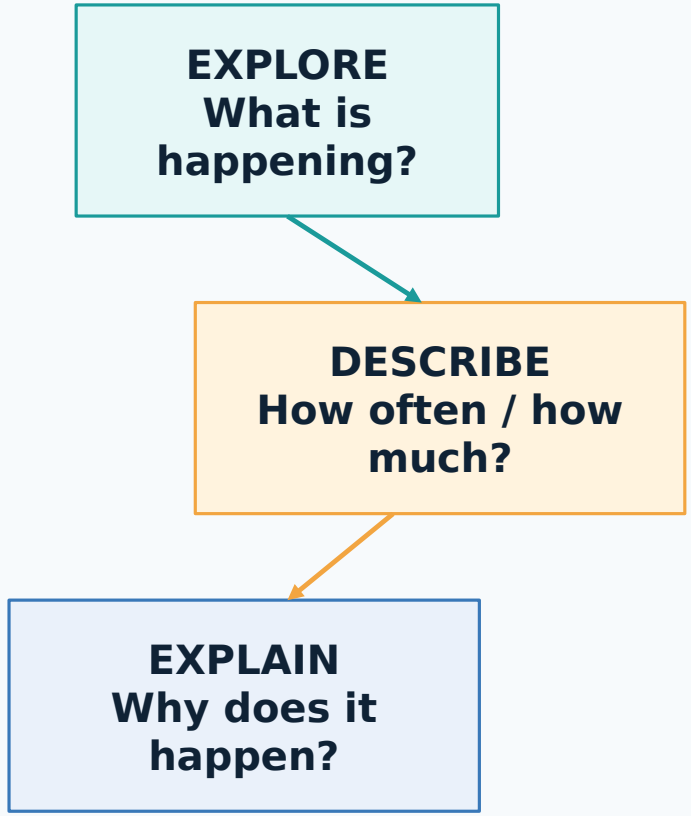
UNIVERSITY LECTURE SLIDES

Exploratory, Descriptive and Explanatory Research

A student-friendly lecture on the three major purposes of research design



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ROADMAP

Lecture Overview

This lecture explains how researchers use exploratory, descriptive, and explanatory approaches to move from early understanding to systematic description and causal interpretation.

1. Foundations

Meaning, importance, key terms, and academic context.

2. Three Purposes

Exploratory, descriptive, and explanatory research explained separately.

3. Design Decisions

How to choose methods, questions, data sources, and analysis.

4. Application

Examples, ethics, mistakes, classroom activity, and knowledge check.

A clear sequence helps students understand when each purpose is useful and how it shapes the rest of the research design.

OUTCOMES

Learning Objectives

- Define exploratory, descriptive, and explanatory research in clear academic language.
- Distinguish the research questions, purposes, methods, and outputs associated with each approach.
- Select an appropriate research purpose for a given problem or early research idea.
- Design a basic study that aligns purpose, participants, data collection, and analysis.
- Identify common mistakes and ethical issues in studies using these purposes.
- Evaluate examples from different disciplines and justify the chosen research approach.

By the end, students should be able to answer:
“What is my study trying to do?”

Introduction: Why Research Purpose Matters

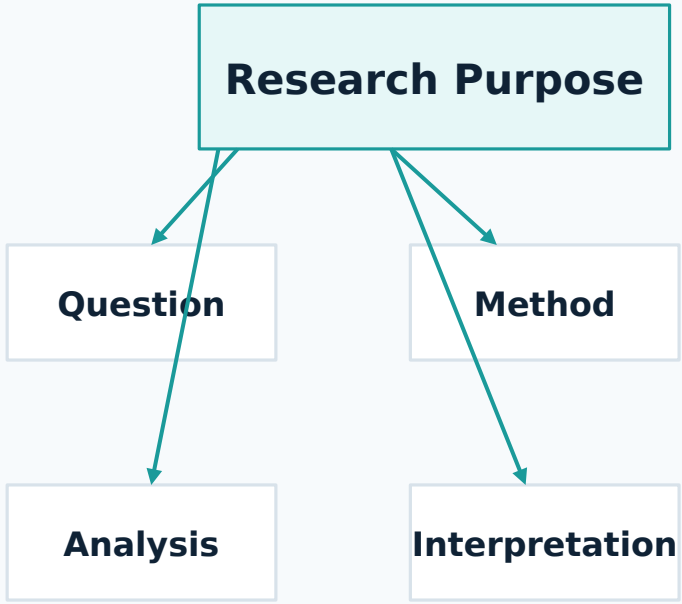
A research purpose is the broad intention of a study. It guides the type of question asked, the evidence collected, the analysis performed, and the way findings are interpreted.

Good alignment

Research problem, question, methods, and analysis all point toward the same purpose.

Poor alignment

The researcher asks “why” questions but only collects simple descriptive percentages.



In academic research, a clear purpose prevents vague studies and helps readers evaluate whether the design is suitable.

CONCEPTS

Key Definitions

Exploratory research

Research used when a topic is new, unclear, under-studied, or poorly understood. It helps generate ideas, concepts, questions, or hypotheses.

Descriptive research

Research that systematically describes characteristics, patterns, frequencies, opinions, behaviors, or conditions.

Explanatory research

Research that investigates causes, relationships, mechanisms, or reasons behind a phenomenon.

Research design

The overall plan connecting questions, evidence, methods, and interpretation.

Causality

The idea that one factor contributes to or produces change in another factor.

Hypothesis

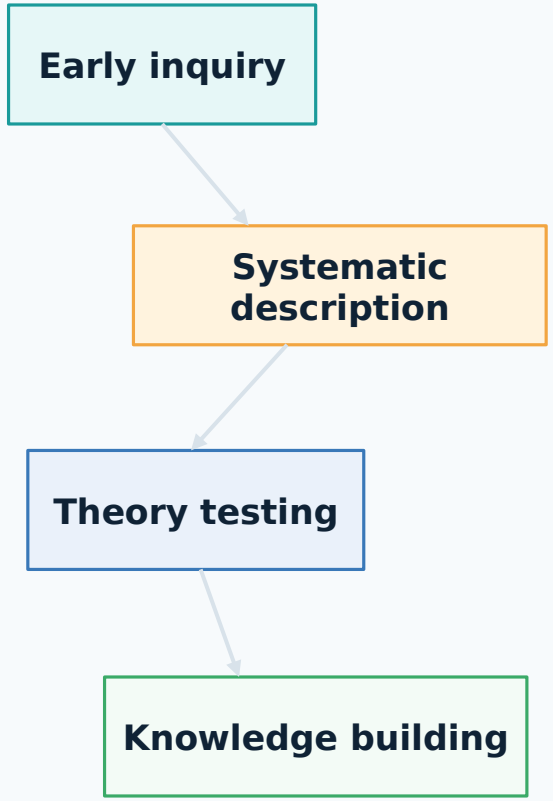
A testable expectation about a relationship between concepts or variables.

These terms are often used together, but each performs a different role in the research process.

Background and Academic Context

Research methods textbooks commonly distinguish studies by purpose. In simple terms, a study may explore an unfamiliar topic, describe a known phenomenon, or explain why relationships occur.

- Exploratory work is common when concepts are emerging or definitions are unsettled.
- Descriptive work is central in surveys, needs assessments, epidemiology, and market studies.
- Explanatory work is important when researchers seek evidence for relationships, causes, and mechanisms.
- A single long-term research program may include all three purposes over time.



MAIN CONCEPTS

Research Purposes in the Design Process

Exploratory question

What meanings do first-year students attach to online learning?

Descriptive question

How many first-year students report high engagement online?

Explanatory question

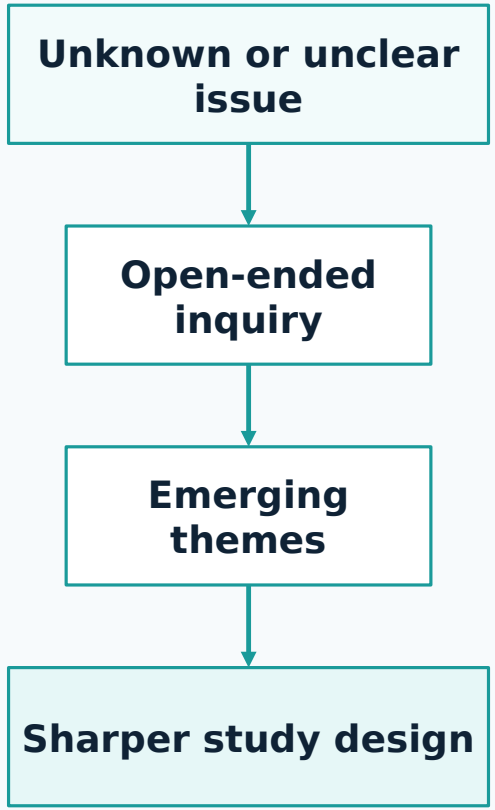
Does feedback frequency predict online learning engagement?

TYPE 1

Exploratory Research: Purpose and Logic

Exploratory research is used when the researcher needs to understand a phenomenon before measuring it in detail or testing explanations.

- Clarifies unclear problems and concepts.
- Identifies possible variables, themes, meanings, or stakeholder perspectives.
- Often produces research questions, conceptual frameworks, or hypotheses for later studies.
- Useful in new technologies, emerging social issues, pilot work, and early-stage theory development.



TYPE 1

Exploratory Methods and Data Sources

Interviews

In-depth accounts of meanings, experiences, and perceptions.

Focus groups

Shared discussion that reveals group language, norms, and disagreements.

Observation

Early understanding of behavior in natural settings.

Document review

Patterns in reports, policies, forums, media, or archival sources.

Pilot studies

Small-scale testing of tools, procedures, or feasibility.

Typical outputs

Themes, initial categories, revised questions, draft instruments, conceptual diagrams, and hypotheses for later testing.

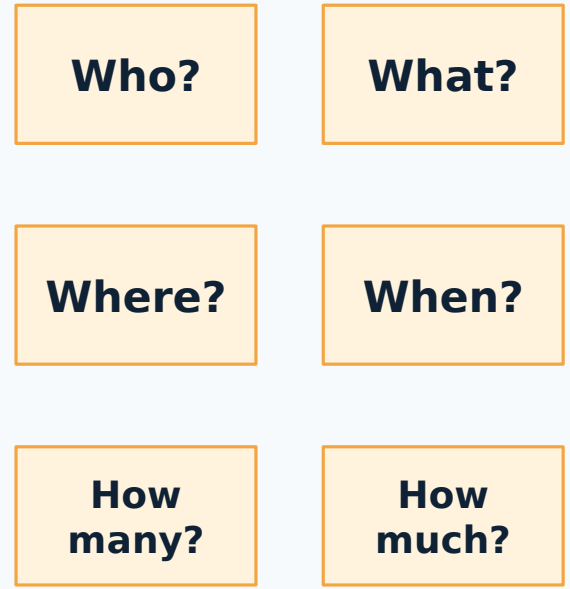
Exploratory data are often qualitative, but exploration can also include preliminary quantitative patterns or secondary data scans.

TYPE 2

Descriptive Research: Purpose and Logic

Descriptive research answers questions about what exists, who is involved, how often something occurs, how much exists, or what characteristics are present.

- Measures or documents characteristics of a population, group, event, setting, or phenomenon.
- Provides a systematic “picture” of current conditions or patterns.
- May use surveys, structured observations, records, tests, or secondary datasets.
- Often summarizes findings with frequencies, percentages, averages, distributions, or typologies.



mportant boundary

Description does not by itself prove cause and effect.

TYPE 2

Descriptive Designs and Data Outputs

Design / source	Main use	Typical output
Cross-sectional survey	Snapshot of a population at one time	Percentages, averages, group profiles
Longitudinal description	Changes over time	Trends, trajectories, repeated measures
Case description	Detailed profile of a single case or setting	Rich narrative or structured case profile
Administrative records	Description from existing institutional data	Rates, counts, patterns, reports

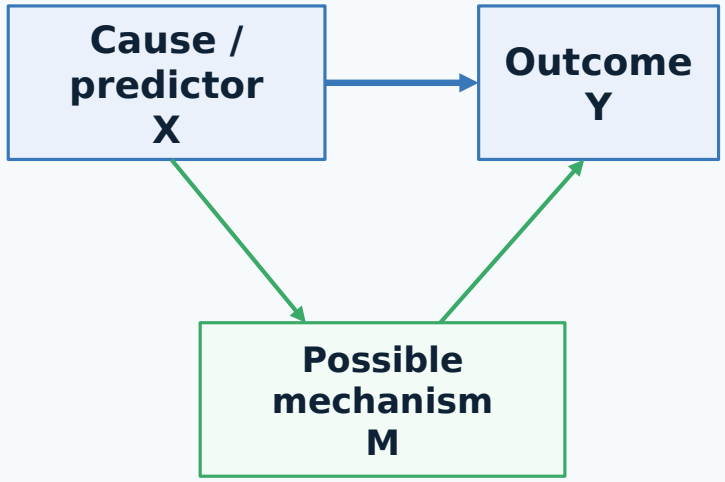
Descriptive outputs are useful for planning interventions, comparing groups, identifying trends, and building a factual baseline before deeper explanation.

TYPE 3

Explanatory Research: Purpose and Logic

Explanatory research investigates why a phenomenon occurs and how variables, conditions, mechanisms, or social processes are connected.

- Examines relationships between variables or concepts.
- Tests hypotheses or builds reasoned explanations.
- May investigate causes, predictors, mechanisms, mediators, or contextual conditions.
- Requires careful design because causal claims need stronger evidence than description alone.



Explanatory question

Why does feedback frequency influence student engagement?

TYPE 3

Explanatory Designs and Causal Thinking

Experimental designs

Manipulate an independent variable and compare outcomes, often with control groups and randomization.

Quasi-experimental designs

Compare groups or time periods when random assignment is not possible.

Correlational studies

Estimate associations among variables; useful for prediction but limited for causal claims.

Longitudinal studies

Track changes over time to strengthen temporal ordering.

Explanatory case study

Examines how and why events occur within a bounded real-world context.

Mixed methods explanation

Combines quantitative patterns with qualitative evidence about meaning or mechanism.

Causal thinking usually considers association, time order, plausible mechanism, and alternative explanations.

SYNTHESIS

How the Three Purposes Relate

Output

Ideas, concepts, initial themes, research questions.

Output

Profiles, patterns, frequencies, trends, distributions.

Output

Tested relationships, causal arguments, mechanisms.

A study may include more than one purpose, but the dominant purpose should be clear.

DECISION GUIDE

Choosing the Right Research Purpose

Your situation	Best fit	Example question
Little is known; concepts are unclear	Exploratory	What issues do users experience with a new app?
The issue is known but its extent is unclear	Descriptive	What percentage of users report each issue?
You need reasons, predictors, or mechanisms	Explanatory	Does app usability predict continued use?
A program needs a baseline before intervention	Descriptive	What are current knowledge levels before training?
A theory or hypothesis needs testing	Explanatory	Does perceived usefulness mediate adoption intention?

Start with the problem and question—not with a preferred method.

PROCESS

Step-by-Step Process for Planning the Study

1

State the problem

What is the issue or knowledge gap?

2

Identify the purpose

Explore, describe, or explain?

3

Write the question

Use wording aligned with the purpose.

4

Select evidence

Choose participants, data sources, and variables.

5

Analyze appropriately

Themes, summaries, associations, or causal tests.

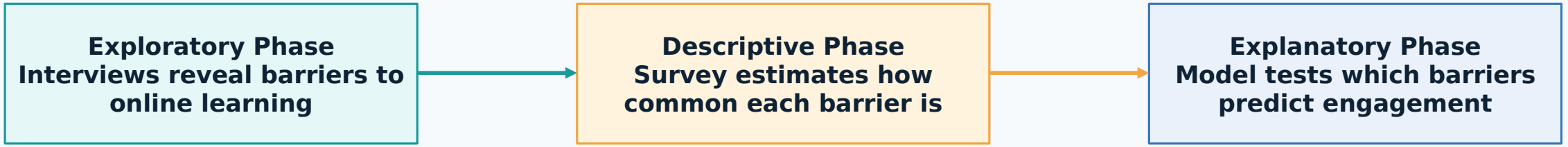
6

Interpret carefully

Match claims to evidence strength.

PROCESS

From Exploration to Explanation: A Research Program


Exploratory Phase
Interviews reveal barriers to online learning
Descriptive Phase
Survey estimates how common each barrier is
Explanatory Phase
Model tests which barriers predict engagement

Question evolves

What do students experience? → How common is it? → Why does engagement change?

Evidence evolves

Interviews → questionnaire responses → statistical model or explanatory case evidence.

Claims evolve

Possible themes → population patterns → reasoned explanations and cautious predictions.

Large research agendas often mature from discovery to description and then to explanation.

EXAMPLES

Practical Examples Across Disciplines

Discipline	Exploratory	Descriptive	Explanatory
Social sciences	Explore how migrants define community support	Describe levels of social trust by age group	Explain how social support affects integration
Business	Explore why customers abandon carts	Describe customer segments and purchase frequency	Test whether discounts increase repeat purchases
Education	Explore teacher experiences with AI tools	Describe AI tool use among teachers	Explain whether training predicts AI adoption
Health sciences	Explore patient concerns about telehealth	Describe telehealth satisfaction levels	Explain predictors of missed telehealth appointments
IT / Psychology	Explore user frustration with cybersecurity warnings	Describe warning-click behavior	Explain how warning design affects compliance

SCENARIO

Research Example: Online Learning Engagement

Research topic

Student engagement in online undergraduate courses.

Research problem

Many students attend online classes but show low interaction and inconsistent participation.

Population

Undergraduate students enrolled in online courses at one university.

Purpose

Start exploratory; later descriptive and explanatory phases may follow.

Research question

What barriers and motivations shape students' engagement in online courses?

Data collection

Semi-structured interviews with students and course participation logs.

Data analysis

Thematic analysis for interview data; simple summaries of participation records.

Interpretation

Findings identify themes and refine a later survey or hypothesis.

Expected interpretation: If interviews reveal feedback delay, isolation, and workload confusion, these may become variables in a descriptive survey or explanatory model.

Data Collection and Analysis by Purpose

Purpose	Data collection	Analysis	Appropriate claim
Exploratory	Interviews, focus groups, observations, pilot data	Coding, thematic analysis, pattern recognition	“These themes suggest…”
Descriptive	Surveys, records, structured observation, tests	Frequencies, percentages, means, distributions	“The sample shows…”
Explanatory	Experiments, longitudinal data, models, explanatory cases	Regression, comparison tests, causal logic, process analysis	“Evidence supports a relationship/explanation…”

nstructor reminder

The strength of a claim should never exceed the strength of the design and evidence.

STRENGTHS

Advantages of Exploratory Research

Clarifies vague problems

Helps researchers understand what the real issue is before collecting large-scale data.

Generates ideas

Produces concepts, themes, variables, hypotheses, and instruments for future studies.

Supports contextual understanding

Captures meanings, experiences, and local conditions that may be missed by rigid designs.

Improves feasibility

Pilot work can detect problems in tools, recruitment, timing, and procedures.

Useful for innovation

Especially valuable for new technologies, emerging markets, policy issues, and new social behaviors.

STRENGTHS

Advantages of Descriptive and Explanatory Research

Descriptive: builds a factual baseline

Provides clear evidence about size, frequency, distribution, and characteristics of a phenomenon.

Explanatory: tests relationships

Examines whether variables, conditions, or processes are connected in meaningful ways.

Descriptive: supports planning

Helps institutions, policymakers, managers, and educators understand needs and allocate resources.

Explanatory: informs action

Strong explanations can guide intervention, prediction, theory development, and policy improvement.

Together, descriptive and explanatory evidence can help researchers move from “what is happening” to “what should be changed and why.”

CRITICAL THINKING

Limitations and Challenges

Exploratory

Limited generalizability; findings may be preliminary and depend heavily on researcher interpretation.

Descriptive

Can show patterns but usually cannot explain why they occur; may suffer from measurement or sampling problems.

Explanatory

Causal claims are difficult; confounding variables, weak temporal evidence, and ethical limits can reduce confidence.

All three

Poor alignment between question, method, analysis, and interpretation can weaken the entire study.

Limitations do not make a study useless; they define how carefully findings should be interpreted.

PITFALLS

Common Mistakes by Beginning Researchers

- Calling a study explanatory simply because it discusses possible reasons, without evidence for relationships or mechanisms.
- Using “exploratory” as a substitute for an unclear plan or weak research question.
- Trying to generalize from a small exploratory sample without appropriate caution.
- Using descriptive survey results to claim that one variable causes another.
- Choosing methods before clearly identifying the research purpose.
- Mixing purposes in the title, question, methods, and discussion without explaining the relationship among them.
- Ignoring sampling, validity, reliability, reflexivity, or bias because the study is “only descriptive” or “only exploratory.”

RECOMMENDATIONS

Best Practices for Applying the Three Purposes

Align language

Use verbs that match the purpose: explore, describe, compare, examine, test, explain.

Define boundaries

State population, context, time frame, variables, concepts, or cases clearly.

Use appropriate evidence

Do not claim causal explanation from purely descriptive data.

Report transparently

Explain sampling, tools, procedures, analysis, and limitations.

Build logically

Use exploratory findings to improve descriptive measures or explanatory hypotheses.

Interpret cautiously

Match conclusions to the design and acknowledge alternative explanations.

COMPARISON

Comparison Table: Exploratory, Descriptive and Explanatory

Feature	Exploratory	Descriptive	Explanatory
Main aim	Discover and clarify	Measure and portray	Explain and test
Typical question	What is happening?	How many / how often?	Why or how does it happen?
Common data	Qualitative or pilot data	Survey, records, structured observation	Experimental, longitudinal, model-based, or explanatory cases
Analysis	Coding, themes, patterns	Frequencies, averages, distributions	Tests, models, causal logic, process tracing
Output	Themes, concepts, hypotheses	Profiles, trends, baseline facts	Relationships, causes, mechanisms
Claim strength	Preliminary and interpretive	Accurate description if sampling and measurement are sound	Stronger explanation if design controls alternatives

RESEARCH ETHICS

Ethical Considerations

Informed consent

Participants should know the purpose, procedures, risks, voluntary nature, and data use.

Privacy and confidentiality

Protect identities, sensitive responses, digital records, and contextual details that reveal participants.

Avoiding harm

Questions, interventions, and reporting should not expose participants or communities to unnecessary harm.

Bias and reflexivity

Exploratory and qualitative work requires awareness of researcher assumptions and interpretation.

Transparent reporting

Do not exaggerate descriptive patterns or explanatory claims beyond the design.

Academic integrity

Report genuine sources, methods, limitations, and findings without fabrication or selective reporting.

ACTIVITY

Classroom Activity: Match the Purpose

Activity objective

Practice identifying whether a research question is exploratory, descriptive, or explanatory.

Instructions

In pairs, classify each question, rewrite one weak question, and justify the method you would use.

Expected outcome

Students can explain how wording changes the research purpose and method choice.

- What challenges do first-year students experience when using learning management systems?
- What proportion of customers prefer mobile checkout over desktop checkout?
- Does teacher feedback frequency predict student motivation?
- How do nurses understand communication barriers during shift handover?

CLASS DISCUSSION

Discussion Questions

- Can a single study be both exploratory and descriptive? When is that appropriate?
- Why is it risky to make causal claims from cross-sectional descriptive data?
- Which purpose is most suitable for a topic with very little prior research? Why?
- How can exploratory findings improve a later survey questionnaire?
- What evidence would make an explanatory study more convincing?
- How should researchers communicate limitations without weakening the value of the study?
- Which purpose best fits your current research idea, and what would you need to change to align it better?

ASSESSMENT

Knowledge Check

- 1. Which purpose is most appropriate when a phenomenon is poorly understood?
- 2. Which purpose best answers “How many people report this behavior?”
- 3. True or false: Descriptive results alone can prove causation.
- 4. Name one common method used in exploratory research.
- 5. Which purpose is most closely linked to testing hypotheses about relationships?
- 6. What is one limitation of exploratory research?
- 7. A survey finds 62% satisfaction. Is this mainly exploratory, descriptive, or explanatory?
- 8. Why must conclusions match the strength of the research design?

ASSESSMENT

Knowledge Check: Answer Key

- 1. Exploratory research.
- 2. Descriptive research.
- 3. False. Descriptive data can show patterns, not causation by itself.
- 4. Examples: interviews, focus groups, observation, document review, or pilot studies.
- 5. Explanatory research.
- 6. It may have limited generalizability and often produces preliminary findings.
- 7. Descriptive research.
- 8. Because overclaiming can mislead readers and weaken academic credibility.

SUMMARY

Key Takeaways

Exploratory

Use it to clarify poorly understood problems and generate ideas, concepts, questions, or hypotheses.

Descriptive

Use it to provide a systematic account of characteristics, patterns, frequencies, and trends.

Explanatory

Use it to investigate relationships, reasons, mechanisms, causes, or theory-based explanations.

- Research purpose shapes the question, methods, analysis, and interpretation.
- Different purposes can appear in one research program, but the dominant purpose must be clear.
- Strong research aligns its claims with the design and quality of evidence.
- Ethical and transparent reporting is essential for all three purposes.

CLOSING

Conclusion

Exploratory, descriptive, and explanatory research are three essential ways of building knowledge. Each purpose answers a different type of question and requires different evidence.

A well-designed study begins by asking: What am I trying to learn, and what kind of evidence would support that claim?

APA 7TH EDITION

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Note: References are included to support general research-methods terminology and design principles used throughout the lecture.

Thank You

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